United States Environmental Protection Agency (EPA)

MIRANT KENDALL STATION - CAMBRIDGE, MA
CHARLES RIVER
PROPOSED NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT
SUMMARY FACT SHEET

EPA and the Massachusetts Department of Environmental Protection have developed a permit for the Mirant Kendall Station (MKS) power plant in Cambridge, Massachusetts to meet the requirements of the Clean Water Act. The proposed permit seeks to address potential adverse impacts to sustainable fish populations, aesthetics, and recreation due to heat, excessive algae growth, reduced water clarity and the intake of cooling water. This permit is an important component of continuing broader public and private efforts to restore the health of the Charles River Basin and Boston Harbor. Since MKS is the largest industrial discharger impacting the habitat and water quality of the lower Charles River Basin, appropriate permit requirements are critical to this larger effort. Establishing these permit limits can be done while allowing the expanded power plant to become a ongoing source of electric power for the greater Boston area.

Facility Changes: In 2003 MKS completed a facility upgrade including a new gas-fired combustion turbine generator. The electrical generating capacity at MKS increased from 113 MW to 283 MW, with an anticipated operational shift from providing electricity only during times of peak need to becoming one of New England's base load power plants. While the conversion from oil to gas as the primary fossil fuel will be beneficial to air quality, potential water impacts center on the continued use of a once through cooling water system which pumps Charles River water, containing small organisms, into plant's condensers and discharges the water at temperatures up to 105° F back to the River. The flow of this once through cooling water can be up to five times greater than the flow of the Charles River during low flow periods. The new capacity at MKS and the continuation of the power plant's present temperature discharge limits of 105° F and an average of 70 million gallons a day (MGD) means about a 400% increase in heat load to the Charles River. For example, there is a 387% increase in heat load when the historic July average heat load of 100 million BTU (British Thermal Units) per hour for the years 1998 through 2000 is compared to the proposed permitted heat load of 487 million BTU per hour.

The Charles River: The Charles River is a highly valued recreational resource and habitat to migratory and resident fish species. In 1995, EPA New England launched the Clean Charles 2005 Initiative. The goal of the Initiative is to improve water quality in the Charles River Basin and fully restore recreational and aquatic life uses. During the last several years intensive efforts have been made at public expense to reduce the discharge of untreated sanitary waste to the Charles River from combined sewer overflows (CSOs) and illicit sanitary connections to storm drainage. As a result, the frequency with which Massachusetts Water Quality Standards are attained for swimming and boating has increased. Some of the remaining water quality problems in the lower Charles River include the regular occurrence of severe algae blooms during summer months, reduced water clarity, high bacteria levels following rainfall, contaminated sediments, and bottom waters with little or no dissolved oxygen for aquatic life.

Algae Blooms: When the excessive growth of small aquatic plants called algae causes increased scum or an increased green or brown color in water, it is called eutrophication. Precisely predicting algae blooms or eutrophication is difficult because of the complex interactions of factors, including the availability of dissolved nutrients, temperature, and how far light can penetrate into the water. The permitted discharge of up to 556 million BTU per hour of non-contact cooling water to the Charles River during the summer months represents a heat load with a reasonable potential to cause or contribute to eutrophication-related and aesthetic and aquatic life impairments in the Charles River. To address this concern, in addition to setting maximum in-stream temperatures to protect fish populations, eutrophication-related monitoring requirements are proposed in the draft permit. Also, a river bottom diffuser proposed by Mirant to spread the discharge of heated waste water and to mix and aerate the Basin is not permitted without further modeling and a more certain understanding of the diffuser's impacts. Along with temperature effects, a primary concern is the potential that resulting changes in the water chemistry near the bottom sediments may trigger excessive release of nutrients and harmful substances. An increase in nutrient availability during the summer months will likely increase the severity of algae blooms.

Thermal Discharge Effects: The permit addresses the impacts of withdrawing, heating and discharging Charles River water at flow rates up to 80 million gallons a day (MGD) through MKS's once-through cooling system. The Charles River supports the growth and reproduction of populations of resident fish such as yellow perch and migrating fish such as river herring. Two species of river herring, the alewife and the blueback herring use the lower Charles River Basin for their annual adult migration and spawning and for the fresh water growth and development of larvae herring to juveniles and then to adults from May to October each year. Water temperature is one of the most important environmental factors affecting aquatic plants and cold blooded animals such as fish. If the water environment is too hot, fish will avoid heated portions of the River or will succumb to lethal or sub-lethal temperature effects, particularly during early, immobile life stages.

Permitted Thermal Limits: The draft permit allows MKS to continue to heat its intake water by up to 20° F and to withdraw and discharge an average of 70 MGD (or a daily maximum of 80 MGD) at temperatures of up to 105° F as long as the temperatures in the Charles River remains safe for fish populations and certain other conditions are met. Thus, maximum seasonal allowable in-stream temperatures for specific locations in the Charles River are established in the draft permit. The permit allows one half of the Charles River in the vicinity of the power plant and Longfellow Bridge to reach temperatures which can be lethal, exclusionary or otherwise harmful to the various life stages of indigenous fish, as long as at least half of the River's cross section maintains temperatures that protect fish populations, including fish migration and reproduction. To ensure these conditions, temperatures at specific locations will be monitored continuously by the permittee to ensure compliance and to ensure that at least half of the River maintains temperatures and oxygen conditions necessary for the protection and propagation of fish populations. Assuming favorable energy market conditions, maintaining these conditions may require MKS to curtail peak capacity operations on certain days, particularly in the summer. However, these permit conditions provide MKS flexibility in its operations to continue to generate electricity for the New England market while not overtaxing the environment.

Cooling Water Intake: The intake of up to 80 MGD of water from the Charles River also

creates adverse environment impacts that must be addressed in accordance with the Clean Water Act. Based on sampling by MKS during portions of 1999 and 2000, 2437 fish, consisting of several species, were trapped against the protective screens that cover the large pipes which pump water from the Broad Canal section of the Charles River into the power plant. This is known as impingement. In addition, based on sampling from the same years, an estimated average of 85,000,000 organisms (eggs and larvae) of primarily river herring and white perch were drawn into the power plant's condensers and exposed to significant thermal and mechanical stress. This is known as entrainment. To reduce the loss of fish due to the intake of cooling water, Mirant proposed constructing a barrier net over the present cooling water intake structure in the Broad Canal. The draft permit requires the use of such a seasonal barrier net or other device that will achieve specific reduction goals. In addition, the permit restricts the monthly average flow of non-contact cooling water to 70 MGD during each of the primary spawning months of April, May and June.

Summary of Major Permit Conditions: In summary, the major proposed permit conditions to protect the fish, water quality and recreational use of the Charles River are as follows:

- **In-stream Temperatures**: Maximum seasonal allowable in-stream temperatures are established for specific locations in the Charles River so that at least one half of the Basin maintains temperatures that support a balanced indigenous population of fish and so that the overall temperature does not contribute to excessive algae growth.
- **Discharge Temperature and Location**: An annual average of 70 MGD of non-contact cooling water can be discharged at temperatures up to 105° F from the present discharge pipes as long as these in-stream temperatures are not exceeded.
- **Barrier Net**: A barrier net or similar device shall be installed over the facility's cooling water intake structures to achieve specific goals in reducing the number of fish that are trapped on or pulled into the cooling water intake structures.
- **Monitoring:** An extensive monitoring program is required to ensure the effectiveness of these measures and the protection of the Charles River.

Public Comment: EPA is accepting written public comments on the Draft permit from June 14, 2004 to July 28, 2004. Written comments should be postmarked no later than July 28, 2004. Before making a final permit decision, EPA will review all written comments. Federal regulations require EPA to respond to formal comments in writing. If you wish to submit written comments or request a public hearing on this draft permit contact:

George Papadopoulos
US EPA, Suite 1100 (CMA)
1 Congress Street
Boston, MA 02114
Email: papadopoulos.george@epa.gov
Fax: (617) 918- 1505

For more detailed information, including any updates during the public comment period and copies of the draft permit and key supporting documents please refer to the world wide web at www.epa.gov/ne/npdes/mirantkendall/ Documents may be downloaded and printed using Adobe Acrobat Reader.